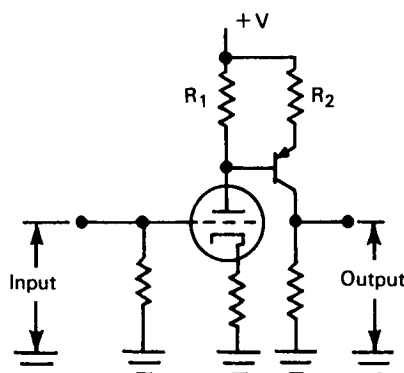


NASA TECH BRIEF

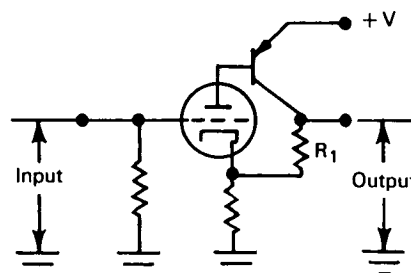


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Simplified Electrometer Has Excellent Operating Characteristics



OLD CIRCUIT



IMPROVED CIRCUIT

The problem: Previous electrometer circuits lacked simplicity and stability of gain and operating point. They had relatively low input impedance, were somewhat nonlinear in response, and required considerable power.

The solution: A circuit that possesses the following characteristics: simplicity, stability of gain and operating point, high-input impedance, linear response, and low power requirements.

How it's done: The operating characteristics are improved by modifying the circuit as shown. The previous circuit has a load resistor, R_1 , in the plate circuit of the electrometer tube, and a resistor (bias), R_2 , in the emitter of the input transistor. The effect of both of these resistors is to reduce the open loop gain of the circuit and to increase the power requirements.

In the improved circuit, the amplifier input transistor base-emitter junction is used as the plate load of the electrometer tube and the collector of the transistor is connected to the following amplifier stage and to a feedback circuit including resistor R_1 . This feedback greatly improves the linearity of the electrometer over its operating range and improves the operating point stability and input impedance. With the improved circuit, no source current is wasted in a plate load resistor and no degeneration occurs due to the emitter bias circuit paralleling the plate load.

Notes:

1. This device should be useful in electrometer applications and in general high-input impedance applications. It would also be useful in instances where linearity and stability are required.

(continued overleaf)

2. Inquiries concerning this invention may be directed to:

Technology Utilization Officer
Jet Propulsion Laboratory
4800 Oak Grove Drive
Pasadena, California, 91103
Reference: B65-10125

Patent status: NASA encourages the immediate commercial use of this invention. Inquiries about obtaining rights for its commercial use may be made to NASA, Code AGP, Washington, D.C., 20546.

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(JPL-413)